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Presidential Address:

Pioneers in Thyroid Surgery

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The extirpation of the thyroid gland for goiter typifies, perhaps, better than any operation the supreme triumph of the surgeon's art.

Halsted

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SIXTY-NINE YEARS AGO the Association met in New Orleans under the leadership of the distinguished Baltimore gynecologist, Howard A. Kelly. Before beginning a learned dissertation on *Art Applied to Medicine and Surgery*,¹⁵ he voiced the customary complaint about the difficulty in selecting a subject worthy of the occasion, and he decried the frequency with which historical themes have been chosen. Said Kelly,

"... The reminiscent address, however, is one of only periodic utility; too often it wearies the hearer like overmuch moralizing. We like at long intervals to visit the graves of the departed, but not to dwell there, for the graveyard soon palls upon us. I think once in five or 10 years is often enough for such an essay, unless, indeed, the attractions of a rare historic locality, like that of this most interesting city, New Orleans, suggests some peculiar fitness for such a theme and almost compels one to break the wise rule—that of indulgence only after a protracted period of abstinence."

Despite the fact that the admirable addresses of my two immediate predecessors have been historical in nature, I have decided to disregard Kelly's admonition. I propose to tell you something of the evolutionary development of thyroid surgery. A compre-

hensive, historical account is not intended; instead, the story will be fragmentarily told by bringing before you in rapid review some of the famous surgeons who were responsible for the remarkable progress which began a little over a century ago.

The definitive history of thyroidectomy is to be found in Halsted's magnificent monograph *The Operative Story of Goiter*.⁸ Published in 1920, this remarkable treatise extends through 166 pages, reviews 375 sources of information and is a model of precision, perception and scholarship. It carries the story from the beginning of the Christian era to 1883, to the time when, in the author's words, "The art of operating for goiter by Billroth and Kocher and men of their school had been almost perfected, relatively minor problems remaining to be solved."⁹

Halsted further asserts that "Greater advance was made in the operative treatment of goiter in the decade from 1873 to 1883 than in all the foregoing years—and, I may say, than in all the years that have followed."¹⁰

In order to fully appreciate the extent and significance of progress during that eventful decade it is important that one should know something of the status of goiter surgery prior to that period.

Historical writings have contained references to goiter for more than 3500 years. Although the idea of

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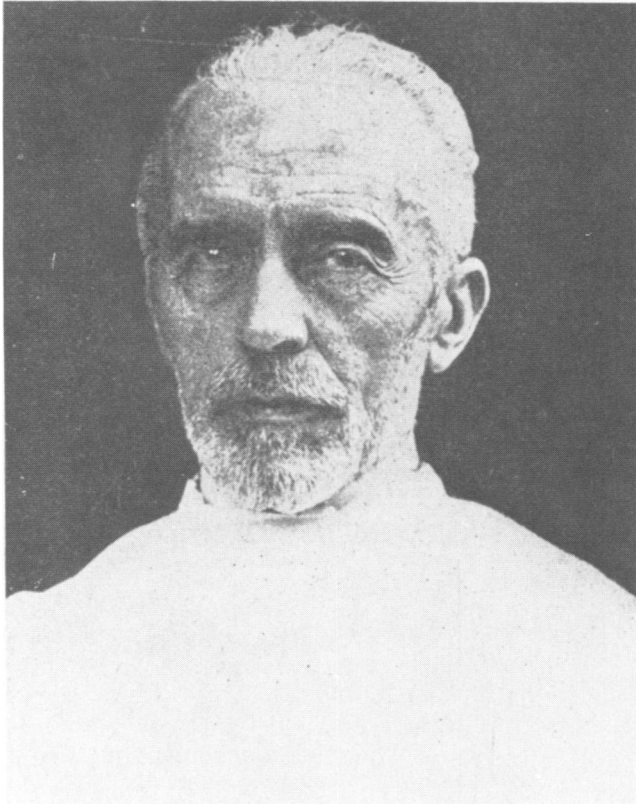


FIG. 1. Theodor Kocher (1841–1917).

surgical treatment of goiter was conceived by the ancients and for centuries rare attempts at removal were made in cases of impending death from suffocation, it is probable that the first typical partial thyroidectomy was not successfully performed until the famous French surgeon, Pierre Joseph Desault, accomplished it in 1791.⁵

Before 1850 about 70 thyroidectomies are known to have been performed, with a mortality of 41%.²²

Some of the recorded details of attempts to excise goiters prior to the days of anesthesia, antisepsis and artery forceps are almost too horrible to believe. With the introduction of general anesthesia in the 1840's the operation was robbed of much of its horror and some of its risk. Infection was the usual cause of death, but it was the fear of uncontrollable hemorrhage that deterred most surgeons from operating. The majority opinion in international surgical circles was that the operation was never justified.

The legendary Robert Liston, one of the most skillful, dexterous and daring operators in the annals of British surgery, apparently was helpless when confronted with a goiter. In 1846 he wrote,

"It has been proposed, again, to cut these tumors out, and some surgeons have ventured upon that, but the result has not been at all satisfactory. You could not cut the thyroid gland

out of a living body in its sound condition without risking the death of the patient from hemorrhage; . . . It is a proceeding by no means to be thought of."¹⁸

Twenty years later from the famed Philadelphia surgeon, Samuel D. Gross, came this statement:

"Can the thyroid gland when in the state of enlargement be removed with a reasonable hope of saving the patient? Experience emphatically answers, no! . . . If a surgeon should be so foolhardy as to undertake it . . . every step he takes will be environed with difficulty, every stroke of his knife will be followed by a torrent of blood, and lucky will it be for him if his victim live long enough to enable him to finish his horrid butchery . . . No honest and sensible surgeon would ever engage in it."¹⁷

This was the position of thyroid surgery as late as 1866. During the ensuing five years there transpired at least three important events which provided tremendous impetus to the operative treatment of goiter. These were Lister's memorable discovery of antisepsis (1867); the development of and wide use of hemostatic forceps in European clinics (about 1870); and Theodor Kocher's succession to the surgical chair at Berne in 1872.

Theodor Kocher (Fig. 1) has been universally and deservedly acclaimed as The Father of Thyroid Surgery. Born in Switzerland in 1841, he was a graduate of the University of Berne. He was a pupil of Langenbeck and Billroth, and spent his entire medical career in Berne, where he became Professor of Surgery at the University in 1872 at the age of 31. He quickly acquired a vast and remarkably favorable experience in thyroid surgery. In a long series of successive reports over a period of more than 40 years he traced the continuing refinements in his technical methods and the progressive improvements in his operative results.

During the first 10 years of his tenure at Berne Kocher excised 101 goiters, with a mortality rate of 12.8%. Two hundred and fifty additional cases were reported in 1889, with a mortality rate of 2.4%. By 1895 his operative mortality for benign lesions had declined to a little over 1%; and in a new series of 560 nonmalignant cases in 1898 to less than 0.2%. In 1917, a few weeks before his death at the age of 76, he made his final appearance before the Swiss Surgical Congress, reviewing his entire surgical experience with goiter, reporting on approximately 5,000 operations with a mortality rate of about 0.5%.

It was in 1883 that Kocher published the historic paper¹⁶ in which he considered the ill effects of total thyroidectomy, and made his greatest contribution to physiology by providing proof that the thyroid gland is an organ essential to health. Speaking before the 12th German Surgical Congress, he presented the now

famous case report of Marie Richsel, the 11 year old girl on whom he had done his first total extirpation. He said:

"... concerning one patient upon whom I had operated on January 8, 1874, the referring physician incidentally reported that the girl had undergone marked change in her personality. Indeed, he finally informed me that she had become quite cretinoid. This seemed to me so important that I made every effort to examine the girl, which was not easy since this physician had died very shortly after making his report. We were all the more intent upon it since our colleague, Reverdin of Geneva, had informed us that he had observed two patients who had suffered diminution of mental capacity following goiter operations. I was highly astonished at the striking appearance of my patient. To crystallize somewhat your impressions I shall show photographs of the girl and her younger sister, taken before and after the operation. At the time of the operation, according to her mother, both girls looked so much alike that they were frequently mistaken for each other. Whereas in the ensuing 9 years the younger sister blossomed into a very pretty young woman, the one operated upon remained small and has an ugly, almost idiotic appearance. As soon as this was determined I immediately requested all of my goiter patients to return for examination."

Of Kocher's 34 patients with total extirpation, 18 returned for examination. Sixteen of the 18 had the symptoms and signs of what we now know to be hypothyroidism. He described with accuracy the clinical picture, speculated at length concerning the possible causes of the mental and other physical changes characteristic of myxedema, observed the striking resemblance to cretinism, and to the syndrome applied the name *cachexia strumipriva*. The realization that this debilitating and potentially fatal complication invariably followed total thyroidectomy so shocked and saddened Kocher that he vowed never again to do a total extirpation for benign disease. Thereafter he advocated lobectomy, reserving total excision for malignancy or the unusual instance in which a bilateral procedure was required for adequate tracheal decompression.

It is of interest that only one case of transient tetany was observed among Kocher's 18 patients with total thyroidectomy; a striking contrast to the relative frequency of tetany in Billroth's experience. Why did Kocher's patients experience myxedema but not tetany after total excision, while Billroth's rarely had myxedema but had a high incidence of tetany? Halsted offers this enlightening explanation:

"I have pondered this question for many years and conclude that the explanation probably lies in the operative methods of the two illustrious surgeons. Kocher, neat and precise, operating in a relatively bloodless manner, scrupulously removed the entire thyroid gland, doing little damage outside its capsule. Billroth, operating more rapidly and, as I recall his manner, with less regard for tissues and less concern for hemorrhage, might easily have removed the parathyroids or at least have interfered with their blood supply, and have left remnants of the thyroid."¹¹

Halsted listed Kocher's most significant contributions in this field as follows: (1) discovery of the fact that total extirpation of the thyroid gland is followed by body changes to which he gave the name *cachexia thyreopriva* or *cachexia strumipriva*; (2) the studies with his life-long friend Langhans of malignant tumors of the thyroid gland; (3) the perfecting of the operation of thyroidectomy; (4) the stimulus which he gave to the operative treatment of Graves' disease and to the study of the milder forms of hyperthyroidism; (5) the recognition of the ingrafted forms of Graves' disease; (6) the demonstration of the value of the ligature of the arteries as a preliminary step in lobectomy, in the highly toxic cases; and (7) the danger of the indiscriminate administration of iodine to patients with goiter.

Although Kocher's most significant contributions lay in the area of thyroid diseases, he was a surgeon of remarkable versatility and breadth of interests. Not even Billroth covered a wider range of subjects than he. Individual contributions are too numerous to mention, ranging as they do over the extensive fields of gunshot wounds, localization of spinal cord lesions, gynecology, diseases of the male genito-urinary tract, fractures and many aspects of abdominal surgery. His operation for hernia, for carcinoma of the rectum, his method of mobilizing the duodenum to expose retroperitoneal structures and his maneuver for reducing dislocation of the shoulder are all well known and still bear his name.

Many professional honors were conferred upon him, including the presidency of the German Surgical Association, the Swiss Surgical Congress, and the International Surgical Congress of 1908. Perhaps he valued most the Nobel Prize in medicine and physiology which came in 1909 in recognition of "his work in physiology, pathology and surgery on the thyroid gland." He was the first surgeon to receive the Nobel Prize, and the only surgeon ever to win it for purely clinical exploits.

Halsted first met Kocher in the summer of 1899. Thereafter he visited the Berne clinic at every opportunity and was often a guest in the Kocher home. He considered him perhaps the greatest surgeon of his time. Although he patterned his residency system after that of Langenbeck and Billroth, it was Kocher's technique which evoked his admiration. In 1920 he wrote:

"Many times during the past 20 years I have stood by the side of Professor Kocher at the operating table enjoying the rare privilege of feeling in complete harmony with the methods of the operator, and it is a pleasure to give expression to the sense of great obligation which I feel to this gifted master of his art and science."¹³

Theodor Billroth (Fig. 2) was generally regarded as



FIG. 2. Theodor Billroth (1829–1894).

the nineteenth century's most distinguished surgeon. He was born on the Baltic island of Rügen in eastern Germany, and was an 1852 medical graduate of the University of Berlin. After several months spent in visiting leading European surgical clinics, he became assistant to Bernard von Langenbeck, the noted director of surgery at the University of Berlin.

In 1856, after three years as assistant to Langenbeck, he became Privat-Dozent (private lecturer) in surgery and pathological anatomy. He was keenly interested in the developing science of microscopic pathology; so in addition to his clinical duties he devoted an extraordinary amount of time and energy to the examination and classification of the vast tumor material in Langenbeck's clinic. His histological, pathological and biological studies and his lectures on operative technique and pathological anatomy published during the Berlin years were so numerous and impressive that while still in his twenties he received many offers of academic appointments in both pathology and surgery.

In 1860, at the age of 31, he assumed the chair of surgery at the University of Zurich. There in a fine new university hospital situated in one of the world's most highly endemic goiter regions, he initiated a cautious

program of surgical attack on large suffocating goiters. During his 6½ years at Zurich he performed 20 thyroidectomies with a mortality rate of 40%. Seven patients died of sepsis; one of hemorrhage. These results he regarded as disastrous. He became so discouraged with the surgical treatment of goiter that he abandoned the operation for almost a decade.

In justice to Billroth it must be remembered that all of his patients had severe pressure symptoms, that the deaths with one exception were due to infection, and that he was without artery forceps and had to rely on aneurysm needles, sutures, hooks and the pressure of fingers or sponges for the control of hemorrhage.

Later in Vienna with increased experience, improved anesthesia, antiseptic technique and artery forceps, Billroth ventured again to operate upon goiter. Thereafter his success was remarkable and he contributed greatly to the advancement of thyroid surgery. It is interesting to compare two series of Billroth's cases. From 1860–1881 he performed 84 thyroidectomies; and this experience can be divided into two periods. In his pre-antiseptic period, 1860–1876, he operated upon 36 patients (Zurich 20, Vienna 16) with 16 deaths, 36.1% mortality. From 1877 to 1881, the antiseptic period, he did 48 thyroidectomies with four deaths, an operative mortality of 8.3%.

By the early 1880's Billroth had become the most experienced thyroid surgeon in the world, and his contributions were important, but it has been suggested that his chief influence was the interest he aroused in and the stimulus he gave to that galaxy of very able assistants, who later became famous surgeons, notably Wölfler, von Mikulicz, von Eiselsburg, von Hacker and Schloffer. Each made important contributions to surgery of the thyroid gland.

Billroth's greatest accomplishments were in other areas. He was one of the most scholarly, productive and influential medical authors of the last century. The volume, scope and quality of his literary efforts were amazing. While in Zurich he published the finest of his books, *Surgical Pathology and Therapeutics in Fifty Lectures*.¹ It appeared first in 1863 and went through a dozen editions and was translated into ten languages. It brought him world-wide acclaim as a writer, investigator and teacher, and was largely responsible for his call to Vienna. It is still regarded as one of the great classics of medical literature.

In 1867 at the age of 37, he assumed the chairmanship of the department of surgery at the University of Vienna. There for 27 years he reigned supreme. A pathologist of great competence and a bold and innovative surgeon, he broadly widened many fields of surgery. In 1873 he performed the first successful total laryngectomy, in 1881 the first successful gas-

trectomy, in 1882 esophagectomy and in 1884 the first total pancreatectomy for cancer.

As a teacher he was unexcelled. His Vienna clinic became a surgical mecca, attracting visitors from all over the world. This was the period of German pre-eminence in surgery, and he was the most eminent of all.

George Crile visited Billroth's clinic in 1892, and later, in his autobiography, recorded these impressions:

"Albert Christian Theodor Billroth was the most distinguished surgeon of his day, with von Bergman of Berlin and Kocher of Berne as close seconds. Billroth was famous for his boldness and initiative in surgery. Through his successful resection of the stomach for cancer about ten years earlier he had laid the foundation for modern abdominal surgery. He was also famous for his work in cancer of the larynx. In those days a professor of surgery was a personality and Billroth was the most impressive of them all—positively godlike in demeanor. He not only wore a long Prince Albert coat suitable to such a position, but he always performed his work with the utmost formality. Promptly at nine the wide doors of his clinic swung open and Billroth with his staff of 20 assistants made a grand entrance. Everything was organized; each case had been studied. Billroth knew each detail. There was no more chance of an error than there was in the performance of a great play. This was the German system . . ."¹³

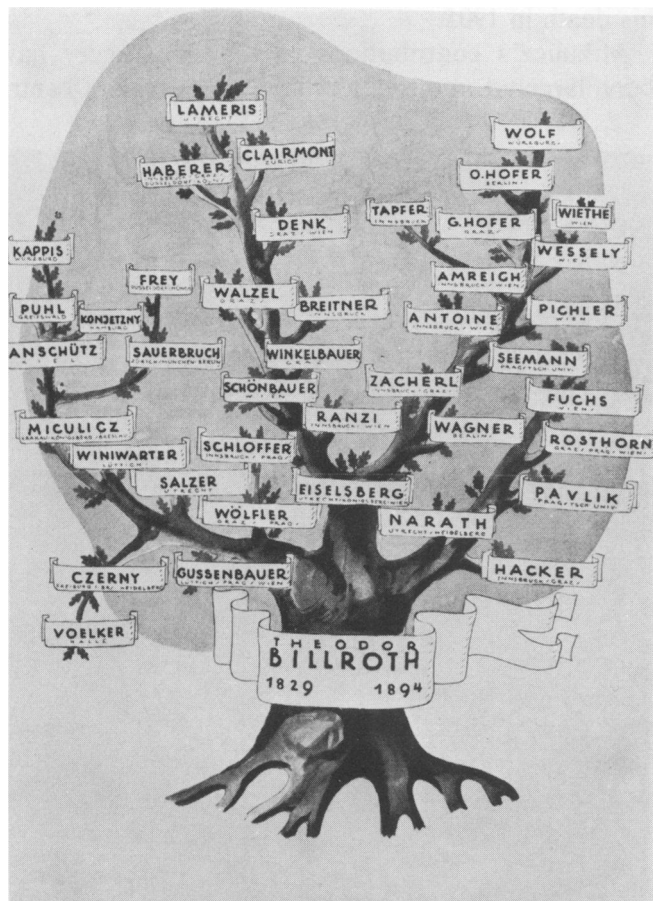


FIG. 3. The "Billroth Tree": The Pupils of Billroth.



FIG. 4. Anton Wölfler (1850–1917).

Although Billroth achieved international renown as surgeon, teacher, scientific investigator, pathologist, philosopher, writer, historian and pioneer innovator in many surgical fields, he played his greatest role as the founder of a great school of surgery (Fig. 3). Many notable surgeons were among his pupils and were able to continue his work in responsible positions as directors of surgical departments of universities and hospitals all over Europe. What an array of surgical talent, von Mikulicz, von Eiselsburg, von Hacker, Gussenbauer, Wölfler, Winiwarter, Czerny, to name but a few! Their friendship, loyalty and achievements were the sources of his greatest pride and satisfaction.

Every young aspirant to a surgical professorial post should acquaint himself with the life and work of Theodore Billroth. He was the model professor. Not only did he possess to a remarkable degree all of the professional, personal, intellectual and cultural qualifications; but he also understood and achieved the proper balance between practice, teaching, research, and extra-curricular commitments. The twentieth century has yet to produce his peer.

Anton Wölfler's (Fig. 4) significant contributions to goiter surgery were made during his 10 years as Billroth's first assistant. He was the first to present a de-



FIG. 5. Anton von Eiselsberg (1860–1939).

tailed description of post-thyroidectomy tetany, and to publish a thorough discussion of the danger of operative injury to the recurrent laryngeal nerve and the anatomical and technical reasons for it. His two classic monographs^{24,25} on the development and structure of the thyroid gland and of goiter were based upon his study of Billroth's operative material. These were valuable expositions of the ideas and experiences of what was at that time the world's most active thyroid surgical center.

Wölfler assumed the surgical chair at the University of Graz in 1886; and in 1895 he moved to a similar position at the University of Prague.

Anton von Eiselsberg's (Fig. 5) important early experimental work on transplantation of the thyroid and parathyroids was fundamental and attracted wide attention. A native Austrian, he began his surgical training with Billroth in 1884, immediately following graduation from the University of Vienna. Three years later he succeeded Wölfler as first assistant, and he continued Wölfler's studies of the tetany material in Billroth's clinic. In 1890 he found that in 30 patients

with postoperative tetany the complication was temporary in 7, permanent in three and fatal in 13. Even at that late date the etiology of tetany was unknown. In the following year, 1891, Gley¹⁶ reported his epochal discovery that post-thyroidectomy tetany was caused either by the removal of the parathyroid glands or interference with their blood supply.

In 1893, at the age of 33, von Eiselsberg became professor of surgery at the University of Utrecht, and he occupied a similar position at Königsberg from 1896 to 1901, when he returned to Vienna to succeed Albert as professor of surgery.

There was no brighter star in that brilliant galaxy of Billroth proteges than Johann von Mikulicz (Fig. 6). An 1875 graduate of the University of Vienna, he spent five years as a Billroth assistant. When he was only three weeks into his internship he was informed that he had better give some thought to a change in career plans; that he was not cut out to be a surgeon.²¹ He persuaded Billroth to give him more time; and with time he proved to be the most brilliant, productive and prominent pupil of the Billroth school.

He accepted the chair of surgery at Krakau, Poland in 1882, moved to a similar position in Königsberg in 1887, and three years later became professor of surgery at the University of Breslau, where he remained until his death in 1905.

Mikulicz's contributions to thyroid surgery have been largely forgotten, although they were of central



FIG. 6. Johann von Mikulicz (1850–1905).

importance. In 1886 he reported that in his first three years as director of the surgical clinic at Krakau he had performed 25 thyroidectomies without a fatality. Seven of these were total extirpations, 8 were unilateral lobectomies, and in two only the isthmus had been excised, and in 8 instances he had done what he termed a "resection," according to a new method of his own, which he described for the first time in this now famous paper.¹⁹

After the conventional apology for the small size of his series, he defined the purpose of his report as follows:

"I shall not hesitate to narrate my experiences since they may shed some light upon the matter which today dominates the whole question of operation for goiter. I refer to the general and local disturbances—tetany, cachexia strumipriva and paralysis of the muscles of the larynx—which follow strumectomy and which, together, demand either an essential curtailing of the indications for operation or modification of the operative method."

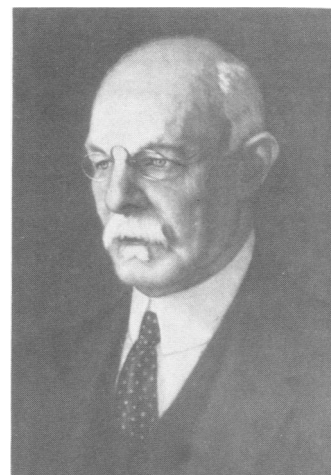
Further on in this important report Mikulicz explains how it happened that he conceived the new operation which he was about to describe—an operation which, with slight modifications, is the one we all use today.

"But it not infrequently happens," he continued, "that, having undertaken the operation with the intention of removing only one lobe, the surgeon finds it necessary to remove the other. I have several times found myself in this predicament. After a very large, forwardly displaced lobe had been excised there would appear for the first time the second lobe which had been concealed behind the trachea, which it surrounded, or had been buried in great part behind the sternum. In such cases one takes a risk if he postpones removing this lobe in the expectation that it may atrophy. It was in a case of this kind that I first practiced the method which I hope may best prevent the evil consequences of total extirpation. I extirpated, namely, the second lobe, only in part, resecting in such a manner that a portion of the lobe remained in the neighborhood of the inferior thyroid artery. The remaining stump of the gland contracted to a nodule the size of a chestnut, resting in the angle between the trachea and the esophagus. Neither the inferior thyroid artery nor the recurrent laryngeal nerve were seen.

"I ventured to do this because I had observed that division and ligation of a quite massive isthmus could be accomplished without evil consequence; the parenchyma of the gland must, therefore, be tolerant of the insult caused by ligation en masse. Hence I need not fear to sever the parenchymal part of the goiter from the remains by means of mass-ligatures passed through the parenchyma."

Mikulicz termed this procedure a "resection," to distinguish it from the typical total excision or extirpation of one or both lobes. He recommended his resection method at a time when the functions of the thyroid and parathyroid glands were unknown. Hence he did not leave a thyroid remnant because he considered it an essential organ. He only knew that total extirpation was often followed by Kocher's cachexia strumipriva or tetany or both. It was recurrence of the goiter and

FIG. 7. William S. Halsted (1852–1922).



injury to the recurrent nerve that he hoped to avoid; and he had learned through experience that sometimes it was necessary to excise the greater part of both lobes in order to decompress the trachea, and that neither cachexia strumipriva nor tetany occurred if a portion of even one lobe remained.

Thus to Mikulicz must go the credit not only for demonstrating the feasibility and value of partial resection in contradistinction to total extirpation of the thyroid, but also for discovering that masses of thyroid parenchyma might be crushed, divided and ligated without fear of uncontrollable hemorrhage or impairment of wound healing. Mikulicz's procedure forms the basis of the modern unilateral and bilateral subtotal lobectomy.

Enumeration of Mikulicz's other major contributions to surgery would take us too far afield. Suffice it to say that in originality, significance and scope they almost rivalled those of Billroth and Kocher. Halsted's final assessment of von Mikulicz was summed up in one sentence: "Surgical art and science owe many a debt to the brilliant and charming Mikulicz of the great school of Billroth."

By the turn of the century most of the problems of goiter surgery had been solved. The operative mortality in simple goiter now was acceptably low; the cause and management of myxedema were understood; and the etiology of tetany had been elucidated. The remaining major challenge was that of hyperthyroidism. It was in the solution of this problem that American surgeons were to play such an important role.

Almost every field of surgery was enriched by the versatile and scholarly Halsted (Fig. 7). In the early years of this century no one in the United States did more to stimulate interest in thyroid diseases or more to standardize technique and promote advance in thyroid surgery.

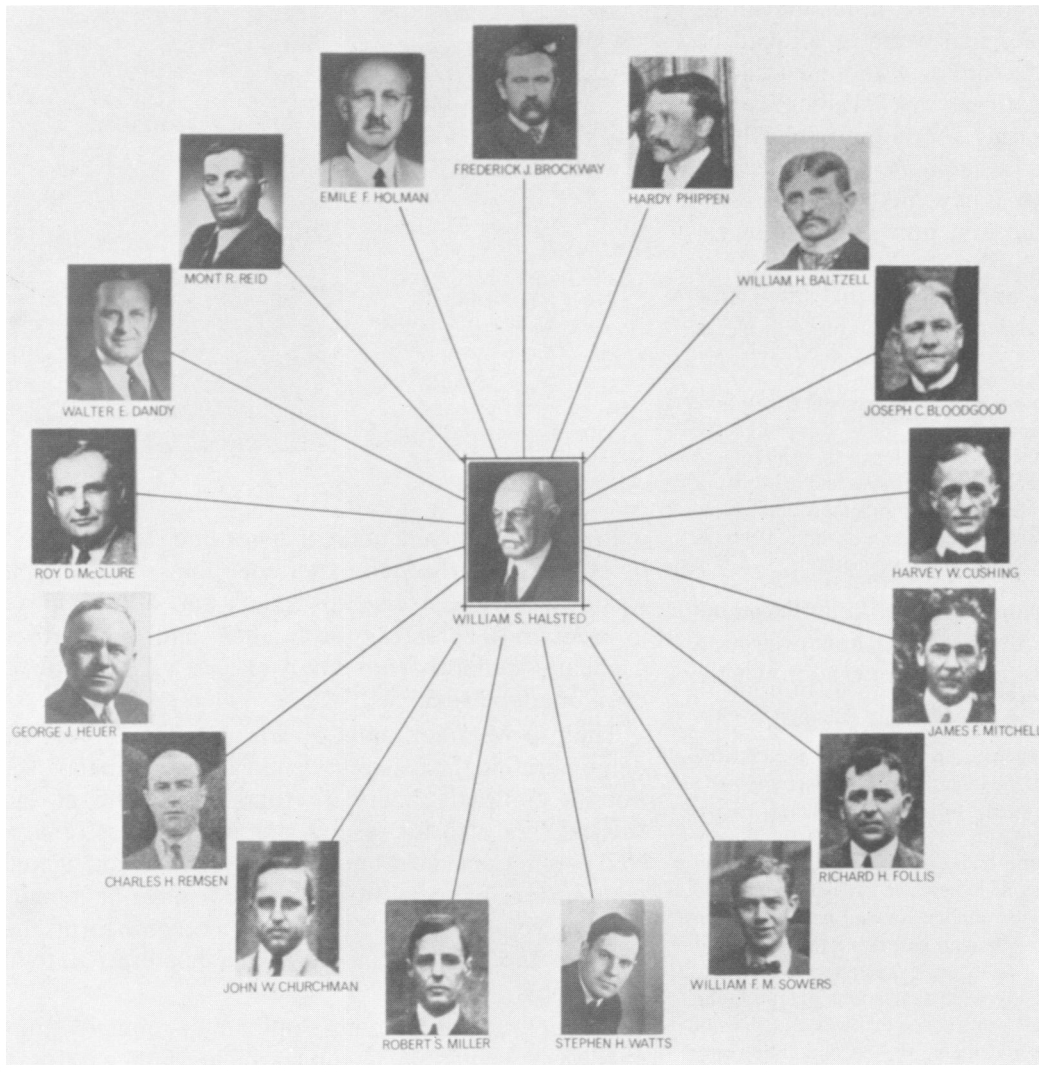


FIG. 8. William S. Halsted and the 17 resident surgeons whom he appointed during the 33 years in which he directed his system of surgical training at the Johns Hopkins Hospital.

Following his graduation from Yale and Columbia University's College of Physicians and Surgeons, and internships at Bellevue and New York Hospitals, he sailed for Europe in the fall of 1878 for two years of intensive post-graduate study in medicine, surgery, the specialties and the basic sciences in the famous clinics in Germany and Austria.

His interest in the thyroid can be traced to the time in Vienna in 1879 when, with Wölfler, he studied the development and structure of the thyroid in fish. Wölfler gave him unrestricted entrée into the surgical wards and Billroth's operating amphitheater.

From 1880 to 1886, the period of his surgical activities in New York, he neither saw nor heard of an operation for goiter except that on one occasion he assisted Dr. Henry Sands in the removal of a small tumor of the right lobe of the thyroid. The patient sat erect in a dental chair for the operation with a rubber bag tied around his neck to catch the blood.

They used only two hemostats, all that Roosevelt Hospital afforded.

Halsted was able to find reports of only 45 operations for goiter in America up to 1883. By that time Billroth alone had done 124. He deplored the delayed development of thyroid surgery in the United States, and attributed it to the tardy acceptance of antisepsis and to a lack of proper surgical instruments. Whereas most of the better surgeons of Germany, Austria and Switzerland promptly and eagerly accepted the teachings of Lister, there were few in America who did so until nearly a quarter of a century later. Indeed, the record seems to indicate that of the thyroidectomies done in this country prior to 1890 not a single one was performed under antiseptic conditions.

The value of the modern hemostat is best expressed in Halsted's own words:

"On my return from Germany in 1881, I was impressed with the fact that our surgeons were greatly handicapped in most of their

operations for lack of proper instruments, particularly of artery clamps. They were insufficient in number and faulty in design. Rarely had I seen in our country, prior to my first visit to Europe (1879), more than one artery clamp at a time left hanging in a wound. Clamps were too few for this—four to three or even two being considered ample for an operation. Few hospitals, in New York at least, possessed as many as six artery clamps in 1880. I recall vividly an operation in Vienna performed by Mikulicz in 1879 in Billroth's clinic. Americans, newly arrived in Austria, we were greatly amused at seeing perhaps a dozen clamps (Schieber) left hanging in a wound of the neck while the operator proceeded with his dissection, and were inclined to ridicule the method as being untidy or uncouth. Slowly it dawned upon us that we in America were novices in the art as well as the science of surgery. The value of artery clamps is not likely to be overestimated. They determine methods and effect results impossible without them. They tranquilize the operator. In a wound that is perfectly dry, and in tissues never permitted to become even stained by blood, the operator, unperturbed, may work for hours without fatigue. The confidence gradually acquired from masterfulness in controlling hemorrhage gives to the surgeon the calm which is so essential for clear thinking and orderly procedure at the operating table."¹⁴

Among Halsted's most significant contributions in the field of goiter surgery may be listed the following: (1) the development of a standardized technique of thyroidectomy based on precise anatomic and physiologic principles; (2) monumental experimental work with thyroid and more particularly parathyroid grafts; (3) in 1879 he popularized the use of hemostatic forceps in the United States and designed the more delicate form of the instrument which still bears his name; (4) the introduction in 1888–89 of his originally designed retractors, ligature carriers, aneurysm needles, scalpels and dissectors which were valuable technical innovations; (5) in 1885 he became the pioneer in local infiltration anesthesia, which greatly improved mortality statistics in thyroid surgery; and (6) the publication of the classic monograph, *The Operative Story of Goiter*.

The Johns Hopkins Hospital opened in 1889 and over the next 10 years only 7 thyroidectomies were done there, 6 by Halsted and one by Harvey Cushing. By 1907 Halsted had performed 90 operations for Graves' disease with a mortality rate of just over 2%. No surgeon had a better record in a sizable series. In 1914 he reported that he had operated on 500 cases of Graves' disease.

Halsted's many other contributions to surgery are too well known to warrant repetition here. His crowning achievement (Fig. 8) was the creation of a great school of surgery, in the words of Rene Leriche, "A school whose splendor has had no equal except in the brilliance of Billroth's students."¹⁷

Since I am not even a remotely related professional progeny, it should not be inappropriate for me to say that one has only to glance at a current roster of in-



FIG. 9. Charles H. Mayo (1865–1939).

cumbents of academic surgical chairs in this country, and the composition of editorial boards of leading surgical journals, and the leadership of prestigious surgical societies to be impressed by the extent to which William Stewart Halsted, through his second and third generations of professional descendants, continues to profoundly and favorably influence American surgery.

Charles H. Mayo (Fig. 9) was an extremely popular and highly respected man who was probably the most experienced thyroid surgeon of his time. He performed his first goiter operation in 1889, and his five thousandth in 1918.

Mayo's operative mortality rate for his first 16 cases of exophthalmic goiter was 25%. By 1908 he had operated upon 234 patients with thyrotoxicosis with a mortality of 6%. In an effort to improve these results Mayo, in 1908, began to employ in the severe thyrotoxics unilateral or bilateral pole ligation as a preliminary to partial thyroidectomy. Although Kocher had for years practiced this staged or graduated operation for exophthalmic goiter, credit is due Mayo for demonstrating by means of a large group of cases the great value of this principle in reducing the mortality rate in Graves' disease. During the year 1912 he operated upon a consecutive series of 278 patients with

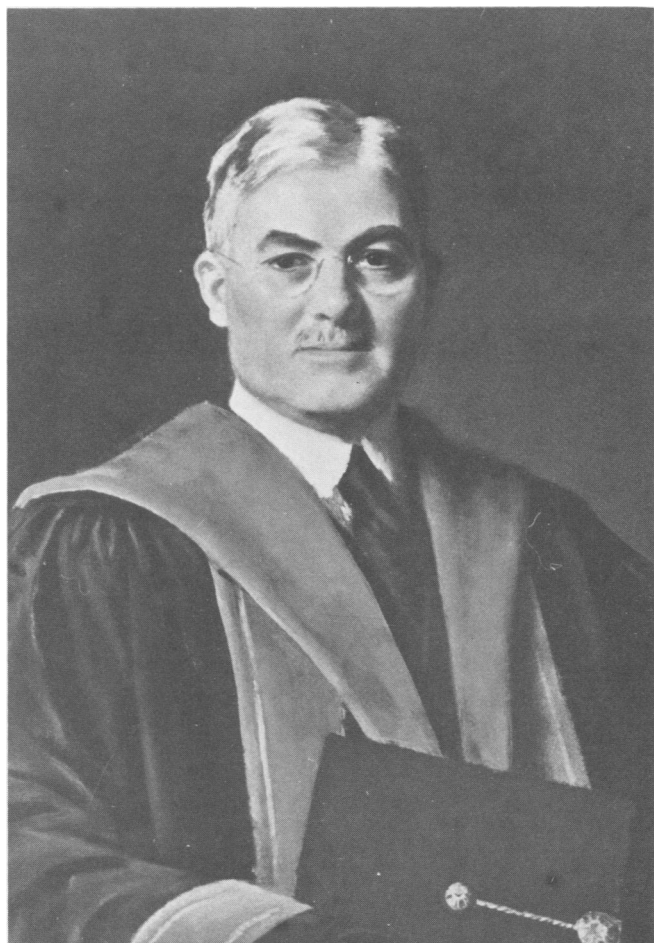


FIG. 10. George W. Crile (1864–1943).

exophthalmic goiter without a death and with only one case of transient tetany.

Charles Mayo was fortunate in having Henry Plummer as his medical counterpart on the clinic thyroid team. By 1913 Plummer had recognized that there were two distinct types of hyperthyroidism, exophthalmic goiter and adenomatous goiter with hyperthyroidism. He stressed their significant differences, and emphasized the diagnostic, therapeutic and prognostic implications.

In 1923 Plummer established the value of iodine in the preoperative preparation of patients with Graves' disease. The extent to which this therapeutic innovation marked a new era in surgery of toxic goiter is indicated in a review of the Mayo Clinic experience which revealed that the introduction of iodine caused a drop in operative mortality rate from between three and 4% to under 1%, and a decrease in the incidence of multi-staged operations from over 50% to 2%.

Like his famous brother, much distinguished recognition came to Charles Mayo. The honors and awards are too numerous for mention here. The Brothers Mayo died in 1939.

George W. Crile (Fig. 10) of Cleveland was for many years one of the busiest and most successful goiter surgeons in the world. He was a man of extraordinary energy, imagination, versatility and capacity. In his dual role as a master surgeon and a research scientist he made many original and highly significant contributions to surgery. Especially noteworthy were his early studies on shock, hemorrhage, transfusions and anesthesia; and his enunciation of the principles of anoci-association. He was keenly interested in the pathophysiology of hyperthyroidism, and in the pre-iodine era he observed that the thyrotoxic was likely to develop prostration during crisis, and he was convinced that overactivity of the central nervous system exhausted the patient. He contended that this could be obviated by preventing noxious stimuli from leaving the operative site with local anesthesia, a process to which he applied the term anoci-association. The concept of "stealing" the toxic goiter was a Crile innovation.

The basis of our present-day method of radical extirpation of head and neck cancer was provided by Crile, who in 1906 reported 132 cases of head and neck cancer treated by radical excision.⁴ He has long been known as the father of head and neck cancer surgery.

For thirty years Dr. Crile was a prime mover in the affairs of The American College of Surgeons. He was one of the twelve surgeons on the original Committee on Organization, was a founder, and was the second president of the College, succeeding Finney in 1916. He was a Regent for 28 years, and was Chairman of the Board of Regents for 13 years.

The last surgeon (Fig. 11) to be discussed is well remembered by most of you. As the author of approximately 150 papers related to the thyroid and as one of the most effective and sought-after speakers of his time, it seems likely that during the second quarter of this century Dr. Lahey did more than any other surgeon to accumulate, impart and disseminate valuable clinical information about surgical diseases of the thyroid gland. His technical methods, which emphasized the division of the strap muscles, wide exposure of the superior poles, and visualization of the recurrent laryngeal nerve and parathyroids, are well known and widely practiced. By the time of his death in 1953 he had personally performed almost 10,000 thyroidectomies. To date over 40,000 thyroidectomies have been performed in his clinic with a mortality rate of less than .10%.

I think that most would agree that the immensity of his experience, the excellence of his results and his many contributions in this field entitle Frank Lahey to inclusion on our list of great pioneers in thyroid surgery.

One of the many things that the Doctors Mayo, Crile and Lahey had in common was fellowship in The

Southern Surgical Association. They were representative of that group of distinguished non-Southern surgeons that almost from the beginning comprised about 20% of the membership of The Southern. They were loyal, respected and popular members who rarely missed a meeting, were almost invariably program participants, and through the years presented some of their best work there.

"But," you may ask, "where are the 1976 Mayos, Criles and Laheys?"

They are here today! They are here in the same proportion, and they are equally eminent, productive and contributory. They continue to add strength, luster and pleasure to these meetings.

This essay does not purport to provide anything new about thyroid surgery, or to teach a history lesson. It is simply intended to refresh your memories, and perhaps enhance your appreciation of some events, some things and some people of some importance.

In emphasizing the need for perspective and the value of a sense of historical continuity, Billroth once remarked: "Only the man who is familiar with the art and science of the past is competent to aid in its progress in the future."²

Owen Wangenstein, distinguished surgeon and educator, and historian of high competence, has lamented the general disinterest by medical school teachers in medical history. Recently he wrote:

"Over the years of his academic tenure, this surgical teacher held to the thesis that all medical disciplines from anatomy to zoology be taught in our schools with special emphasis upon the historical approach. Yet how few of our medical school teachers observe this guideline. At one time I believed it was because of lack of interest in medical history, but with the years I have come to realize that only the most erudite amongst medical school teachers actually have more than a nodding acquaintance with the background of their own discipline."²³

Of what value are these things to busy pragmatic practitioners of surgery? I submit that the cultivation of an interest in surgical history can add to our pleasure, broaden our vision, intensify our professional pride and enhance our effectiveness as practitioners and teachers.

The great pioneers in thyroid surgery about whom I have talked today wrote a significant chapter in the history of surgery. Reflection on their achievements, lives and legacies brings to mind the splendid tribute which appeared in *The British Medical Journal*²⁰ a few days after Kocher's death. It was from the pen of Sir Berkeley Moynihan. I quote a portion of it:

"What is the chief legacy a surgeon leaves behind him? Personal reputation, however exalted, is soon forgotten, and the name of a distinguished surgeon may not be long remembered even in his own country. Books, which at the time of their appearance are striking in new thoughts or in the fresh presentation of old ones, cease soon to be read. Even in the long survivors new editions change not only their contents, but perhaps the title also.



FIG. 11. Frank H. Lahey (1880–1953).

The spoken word, whether by the bedside or in the theater, is apt to slip from the memory or to be imperfectly recalled. A few characteristic sayings may chance to be handed down, but their authorship is soon lost. Wealth is, of course, rarely attained by any member of our profession, and for itself has happily no value among us.

"The chief legacy which a surgeon can bequeath is a gift of the spirit. To inspire many successors with a firm belief in the high destiny of our calling, and with a confident and unwavering intention both to search out the secrets of medicine in her innermost recesses, and to practice the knowledge so acquired with lofty purpose, high ideals and generous heart, for the benefit of humanity—that is the best that a man can transmit."

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